LANL Progress Status Report

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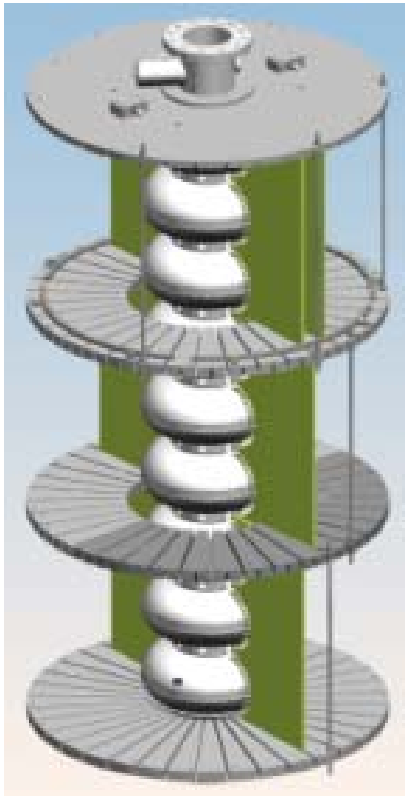
SRF Lab restarted its activities officially in June 2007 when a new funding ($371K) for the ILC from DOE/HEP arrived for FY07 thanks to FNAL and other collaborators

- **Our first mission is develop tools and find effective methods to analyze SRF cavities especially those that cannot reach 25 MV/m (or some specified number).**
- **Our first priority now is to complete a 9-cell cavity temperature mapping system by mid September and test it with a cavity by 30 September 2007.**

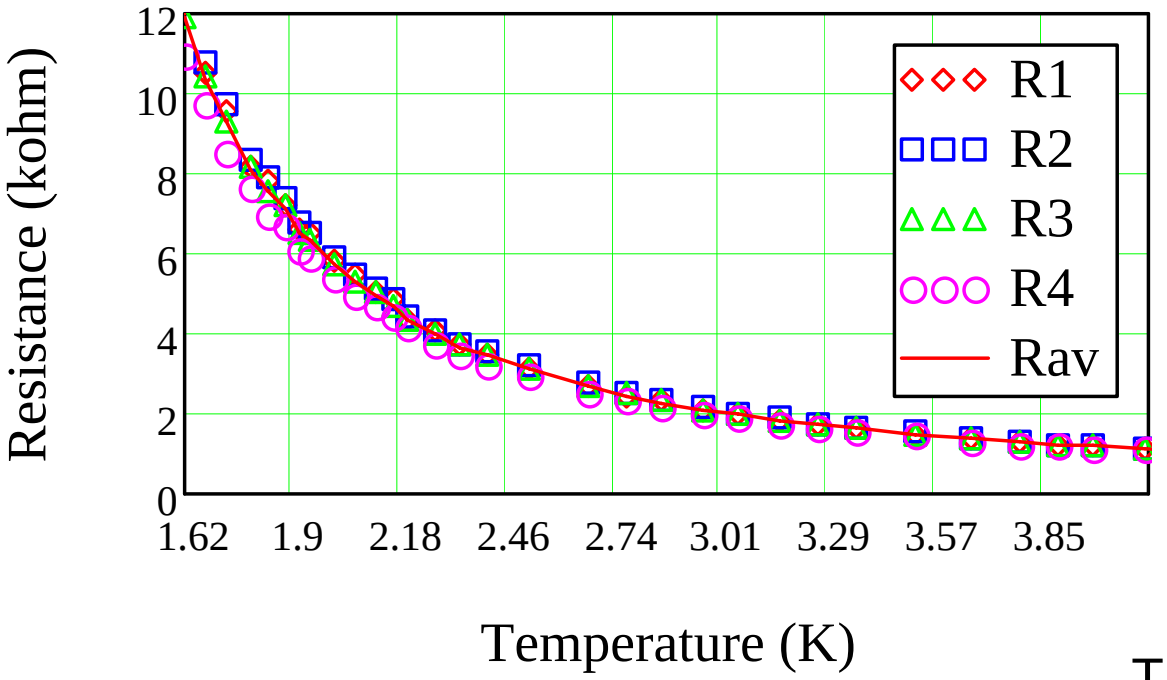
Temperature mapping system for 9-cell ILC cavities



Only 7 boards are shown out of 108 boards.

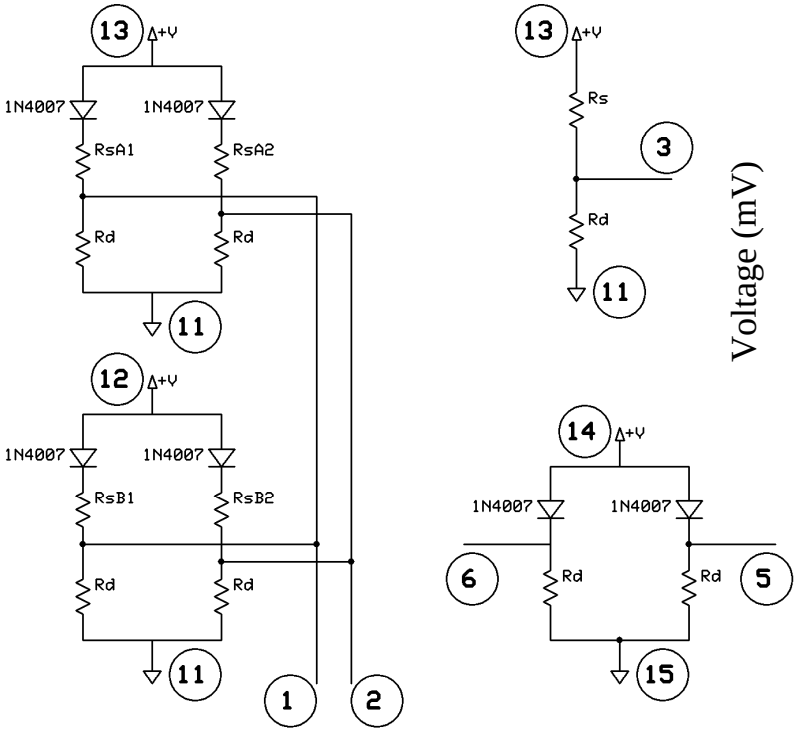
- **~5000 Allen-Bradley 100-ohm resistors to be used as sensors**
- **15-17 sensors per meridian per cell and every 10 degrees.**
- **36 G-10 boards cover 3 cells and there will be 108 boards in total.**
- **We will power only 12 boards (40 degrees) at a time to reduce the number of cables that come out of the cryostat to ~720.**
- **The power switching will be done in the cryostat.**
- **Expected time for one mapping is ~2s.**

7000 Allen-Bradley 100-ohm resistors were purchased and some were tested and showed good sensitivity

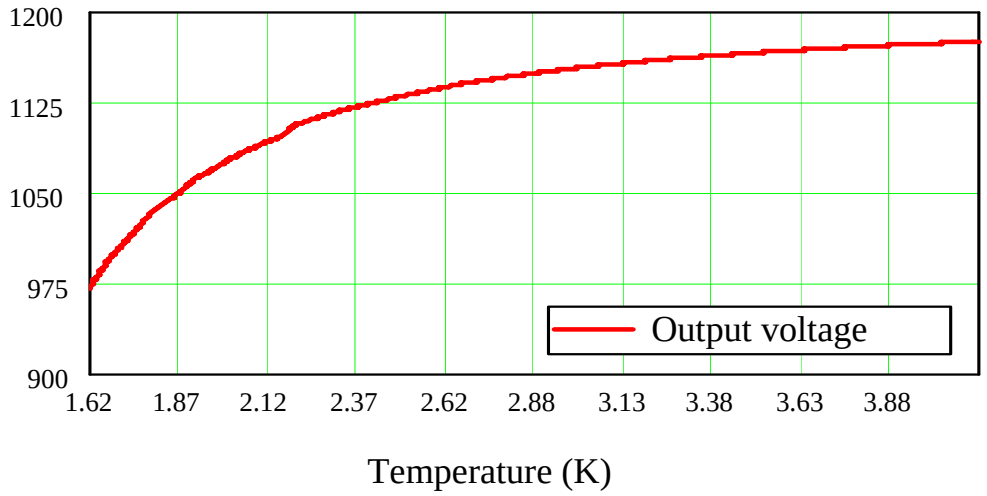


This test was done by G. Ciovati at Jlab.

For the switching of sensors in the cryostat, temperature insensitive diodes and resistors were selected after testing them



Estimated output voltage vs. temperature



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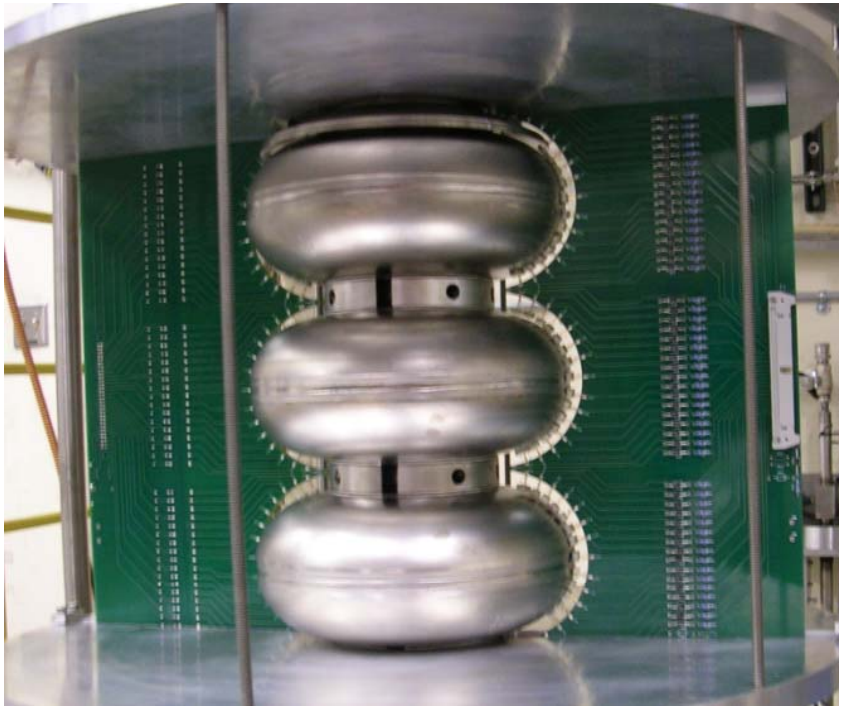
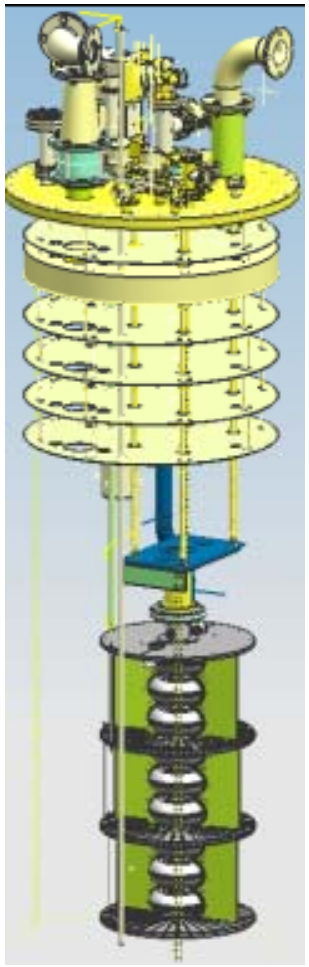
Two prototype boards with complete circuits were fabricated and attached on a 9-cell cavity



Shown at the PAC07 tour on 30 June 2007

Plan to complete the first system and show first results at SRF2007 workshop in October 2007.

Our second priority in FY07 is restart the SRF Lab and reach the point where we can test 9-cell cavities



- **Ongoing activities:**
  - Modify the cryostat insert
  - Modify RF measurement system for 1.3 GHz cavities. (Our current system is for 350 MHz and 700 MHz cavities.) We have 200W amplifier, but will purchase ~500W one in FY08 for high gradient and RF processing.
  - Re-certify the clean room and ultra-pure water system for high-pressure rinsing.
  - Re-certify safety interlocks for radiation and oxygen monitors
- **We plan to complete some of these by 15 September 2007 to test a cavity.**

Superconducting RF (SRF) Laboratory

Superconducting cavities are assembled in a 2600 ft^2 Clean room

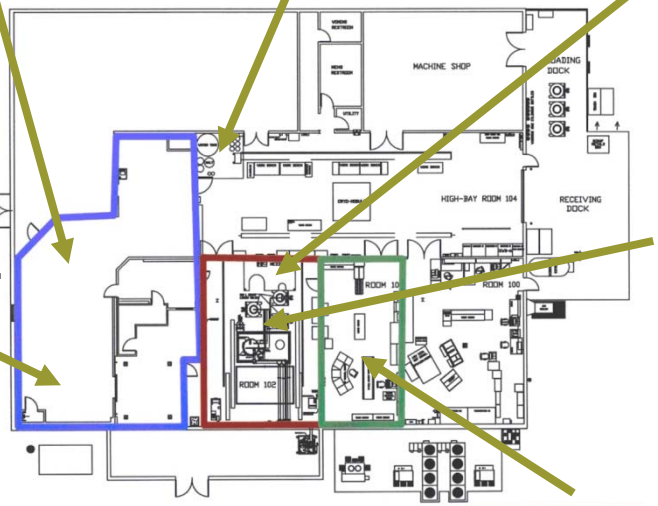
2000 gallons/day ultra-pure water system for high-pressure rinse

Two cryostat inserts

High-pressure rinse in a clean room.

140 ft.

100 ft.

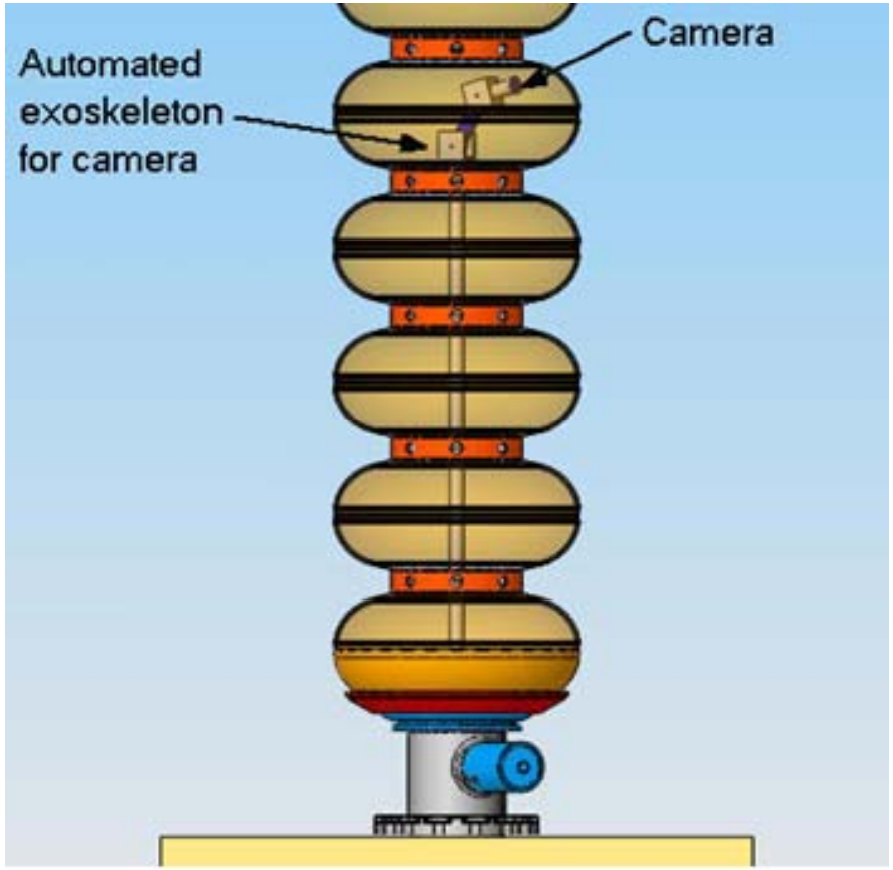


38-inch diameter 10-ft deep cryostat

Control, tuning

Building MPF-17

Automated inspection system will be built in FY08



- **Pre-conceptual design started in June 2007.**
- **A clean camera will be used in a clean room.**
- **A camera with ~10 um resolution will go to the coordinates identified by the T-map analysis.**
- **Depending on the nature of the surface, we will develop repair tools**

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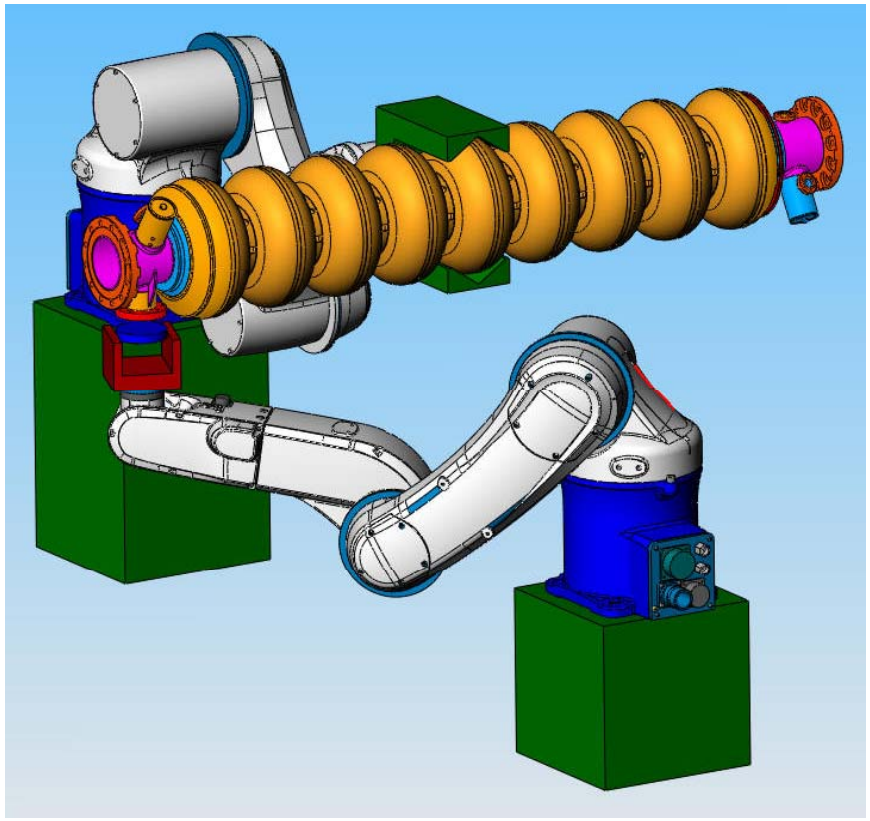
Automated clean assembly (especially sealing of flanges) with cleanroom compatible robot arms could increase the reliability and productivity



- Starting with high pressure rinsing
- Up to the point where all the ports are sealed with flanges
- 24/7 operation could be possible
- This work will continue if we get enough funding in FY08 and/or FY09

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Summary

- **LANL has received our first funding for the ILC in June 2007.**
- **Our mission is to develop tools and analyze SRF cavities especially those that do not make 25 MV/m, which will hopefully lead to a better manufacturing process in industry and give some insight into better surface treatment.**
- **Our highest priorities in FY07 is to develop a T-mapping system for 9-cell cavities and re-start the SRF Lab to be able to measure 9-cell cavities in a vertical cryostat**

Issues that need to be discussed

- **Can we borrow a 9-cell cavity to test the T-mapping system with modified RF measurement system between Sept. 17 and Oct. 12, 2007?**
- **Can we get the cavity under vacuum and with input and pickup couplers attached after tested at another lab so that we won't need to clean the cavity before testing? Otherwise, it will introduce a new factor and complicates the analysis. (Also, there will be a chance of insufficient rinsing since we will have not optimized our HPR system at that time.)**